Safety Authority

State of **Safety** Report | 2009

British Columbia Safety Authority

At the British Columbia Safety Authority we keep people safe. As the Province's delegated authority, we mandate the safe installation and use of technical equipment. We're a not-for-profit that administers safety standards through education, and through issuing permits and licences. We also enforce compliance to standards to ensure consistency and fairness, and conduct onsite inspections – particularly in high-risk situations. We continuously research trends to advance the standard of safe practices in our province.

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Message from the Chair	2
Message from the President and Chief Executive Officer	3
About this Report	4
Improving Safety	5
Our Technologies	9
Incidents Summary	10
Amusement Rides	14
Boilers, Pressure Vessels & Refrigeration	18
Electrical	22
Elevating Devices	26
Gas	30
Passenger Ropeways	36
Railways	40
Appendix A: Municipalities that administer portions of the *Safety Standards Act*	44
Definitions	45

MESSAGE FROM THE CHAIR

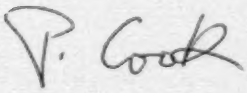
I am pleased to present the 2009 State of Safety Report prepared by the BC Safety Authority. Our intent with this report is to openly share information and analyses about safety hazards and trends with industry, government, the public and other organizations.

Our accountability as the Province's delegated authority and regulator of the *Safety Standards Act* correlates with the trust and confidence of our stakeholders, industry and the public. Transparency is vital if we are to build on these values. With this report, we make available the information and analyses that reflect our province's technical safety environment. The analysis of reported incidents, inspections performed and enforcement actions taken gives us an understanding of the state of safety in each of the technologies we regulate. This report also presents the initiatives taken to address safety issues and trends in our province.

The safety system is more than just technical data. It is built on collaboration and cooperation between individuals, organizations and industry who aspire to safety excellence and share the same passion for safety as the BC Safety Authority. By working together with British Columbians, we will continue to strengthen the safety of equipment and products that will, in turn, advance the safety environment for all people in our province. This report highlights the initiatives taken to engage and collaborate with stakeholders in each technology.

From my perspective as Chair of the Board of the BC Safety Authority, I am pleased to see the growing desire for increased education and research from our clients and stakeholders. Integrating education and research with a risk-based approach can only enhance public confidence in the safety system.

On behalf of the Board, I would like to thank the officers and staff of the BC Safety Authority for their excellent work, industry for collaborating with us to comply to safety standards, and our many stakeholders for their support and valuable insight into the safety system.



Peter Cook, Chair of the Board

MESSAGE FROM THE PRESIDENT & CHIEF EXECUTIVE OFFICER

British Columbia is safe. But at the same time, regulators like the BC Safety Authority and industry all need to do more to ensure the safety system continues to be a high priority. That is why, in part, we report on the state of safety in BC through this annual report.

This State of Safety Report reviews data gathered between January 1 and December 31, 2009. The data represents incident statistics, safety trends, actions taken by the BC Safety Authority and technical interpretation that will help us develop initiatives and programs to further enhance safety for British Columbians and prevent accidents.

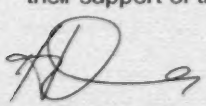
Our operational model consists of education and outreach, inspection, research and enforcement. This model is based on controlling risks to prevent accidents. To enable the efficacy of this model, we made the strategic shift of our resources from relying on inspection for code compliance as the primary safety tool, to a multifaceted safety system that focuses on higher-risk areas. This shift required a systematic identification of high-risk exposures and a disciplined effort to reduce associated hazards. In 2009 there was an increased emphasis on enforcement and 2010 will see both the significant development in the education component as well as planning for the expansion of research over the coming years. The strategic priorities identified for 2010 are education and enforcement plus strengthening our business practices by enhancing risk management and improving our information technology systems.

In 2009, we shifted resources towards more collaborative and higher-value activities that resulted in larger safety outcomes. Highlights included:

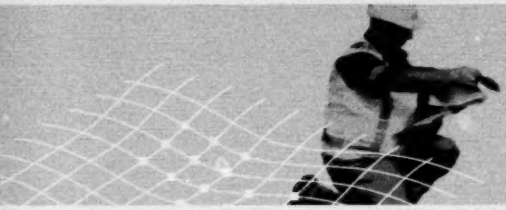
- Providing regulatory oversight of Terasen's conversion of Whistler from propane to natural gas,
- Developing and implementing an Olympic Safety Plan to ensure that the Vancouver Organizing Committee properly assessed, permitted and operated venues regulated by the BC Safety Authority during the 2010 Olympic and Paralympic Winter Games,
- Providing regulatory oversight to the Canada Line, which connects the Vancouver International Airport to downtown Vancouver and the City of Richmond,
- Bringing more amusement ride operators into the safety system,
- Working further to consult and collaborate with key industry associations, who are as vested as the BC Safety Authority in ensuring a safer BC, and
- Enhancing our enforcement program to level the playing field and bring individuals and companies who choose to work outside of the system into compliance.

We are, however, saddened by six reported fatalities in 2009. We are committed to collaborating with other authorities investigating the causes of these fatalities. The lessons learned from these investigations will be incorporated into the safety system as part of our continuous effort to improve safety for all British Columbians.

I would like to thank our Board of Directors for providing valuable direction and guidance, our employees for their passionate work in helping to keep our province safe and our stakeholders for their support of the safety system.



Harry Diemer, President & Chief Executive Officer



About this Report

The *2009 State of Safety Report* is the sixth annual publication on the state of safety for the technologies overseen by the BC Safety Authority. This report provides a summary of the outcomes of inspections and assessments carried out by our safety officers, as well as an overview of reported incidents between January 1, 2009 and December 31, 2009, including the number, types and causes of incidents reported in each regulated industry.

This report identifies safety risks. It is not the intent of this report to provide detailed information about specific incidents. The analysis of this data is used to develop accident prevention strategies in specific industry sectors. It is intended that this information will provide other organizations, industry and the public with information about safety hazards and trends so that we can act together to prevent accidents and incidents before they occur.

By sharing the analyses about the safety risks, and by consulting and collaborating with British Columbians, our clients, stakeholders and the public have the ability to make choices to prevent accidents. With this approach, we are developing a more interactive and far-reaching safety system.

DATA COLLECTION AND ANALYSIS

Our incident reporting system and incident data collection methods have been evolving since the BC Safety Authority began operations in April 2004. Inspection data has been collected for four years starting in 2005, and incident data has been compared with yearly incident results since 2006.[1]

The data included within this report was obtained from the BC Safety Authority's incident investigation records and safety officer inspection reports for 2009.[2] This report describes the distribution and characteristics of the incidents that occurred in 2009, provides details on the injuries and fatalities in the regulated technologies and outlines the activities conducted to prevent additional incidents or mitigate the consequences of future incidents. In addition to highlighting safety risks, this report identifies areas where safety can be improved.

Data collection and its analysis are critical to understanding safety risks and how best to control them. Consequently, over the next three years our objective for research is to design and develop leading-edge risk analysis practices. To this end, planning is underway to develop in-house analysis and design expertise and deliver analysis skills training to staff for reviewing investigations and improving both the quality and consistency of data collection methods.

1 Revisions and changes to reporting methods have been ongoing as continual improvements are made to the process. As different collection methodologies were used, comparisons of inspection data prior to 2005 and incident results from years prior to 2006 are of limited value.

2 The Province of British Columbia has entered into agreements with authorities other than the BC Safety Authority to provide inspection and incident investigation services for specific regions or industries as described below. The inspection and incident investigation data from these authorities, while analyzed, has not been included in this report:

- Ten municipalities in British Columbia have agreements to administer portions of the *Safety Standards Act*; eight municipalities administer all aspects of the *Electrical Safety Regulation*; and seven municipalities administer the *Gas Safety Regulation* for specific sizes and types of equipment. These municipalities are listed in the Appendix to this report.
- In accordance with an agreement with the Province, incidents for common carrier railways are reported to and investigated by the Transportation Safety Board of Canada.

Improving Safety

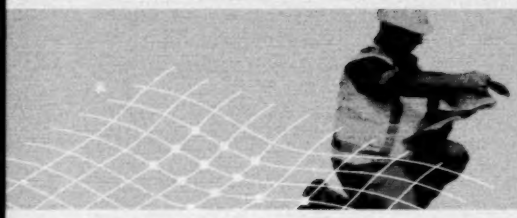
Since 2008, the BC Safety Authority has shifted its resources to the implementation of our operating model, an accident prevention and service delivery model based on risk control. This model concentrates on four areas or "pillars" to support the safety system: education and outreach, inspection, research and enforcement.

- **Education and Outreach:** To increase the flow of information and knowledge between the BC Safety Authority, the public and industry through awareness campaigns, information sessions, code updates, bulletins, our website and on worksites.
- **Inspection:** To use risk-based inspection services to prevent hazards and promote duty holders' responsibility for the risks they create.
- **Research:** To conduct data gathering and analysis, enabling the BC Safety Authority to identify hazards and trends that will help industry to act and prevent incidents before they occur.
- **Enforcement:** To "level the playing field" and increase the accountability of non-compliant contractors.

Implementing the model meant that our approach shifted from relying on inspections ensuring code conformance as the primary safety tool to a multifaceted safety system designed to focus our resources on higher-risk areas. We do this by systematically identifying high risk exposures and reducing the associated hazards to prevent accidents.

Building on the activities of 2008, where the focus was promoting safety through education and outreach, the BC Safety Authority developed its program for the enforcement pillar in 2009. The objective of the enforcement program is to change behaviour by requiring regulated companies and individuals to promptly take action once a serious risk has been identified and impose sanctions on those who fail to meet their responsibilities. Proper enforcement actions will increase safety and "level the playing field" by reducing the number of people trying to seek economic advantage through illegal or substandard work practices. The development of the enforcement program was based on the four principles: action proportionate to the risk, timeliness, consistency, and fairness and transparency. These principles ensure that stronger enforcement is used for more serious infractions, enforcement actions are applied immediately after a violation has been identified, enforcement policies are succinct, and when used, enforcement actions are communicated to all regulated parties. Two enforcement specialists were hired to support safety officers in their daily enforcement activities and provide training in enforcement procedures. Enforcement policies and procedures were revised to provide clear guidance to staff.

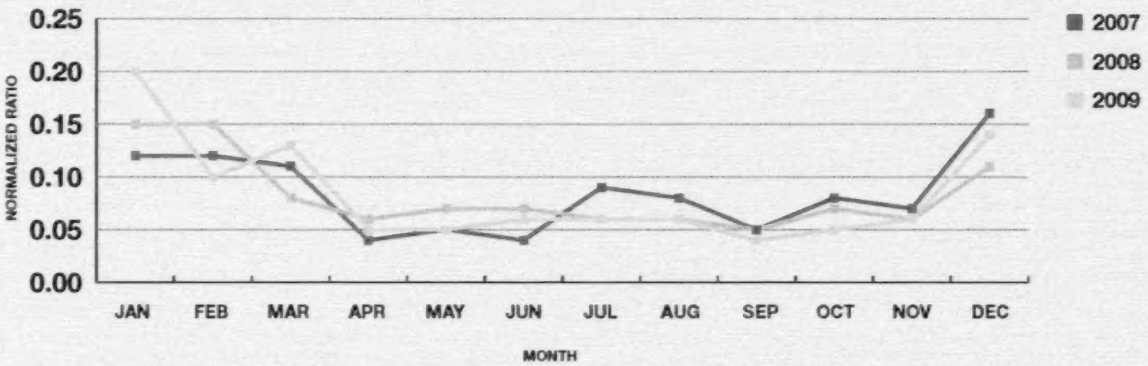
As we continue to implement the operating model, integrating the research component with the other pillars will become crucial. Research is in its very early stages, with a few building blocks underway. This is a critical prerequisite for building the organizational knowledge necessary to develop effective and dynamic safety system policies. Research looks ahead by developing forecasting tools to detect trends and identify safety issues. Research also takes place in real time, through the identification and analysis of non-compliances. And importantly, research must look to the past to establish patterns of behaviour, and causal factors, in order to recommend whether



education or enforcement actions will control the risk. Research is dependant on the development of a more robust information technology system, and its full implementation is likely between three to five years away. In 2010, the BC Safety Authority will establish a framework that will serve as a basis for a research plan for 2011 and beyond to fully integrate research into the operating model.

In 2009, the research team compiled and verified the incident data from 2006 to 2008 to develop a database from which initial analysis could be carried out. This analysis focused on determining the quality of data input in three areas: accuracy, timeliness and quantity. A quarterly reporting process to track these aspects was developed to monitor the BC Safety Authority's internal procedures and thereby improve the quality of incident data. From previous years' incident data, we identified a strong seasonal pattern to incidents and noted that males were much more likely to be involved in incidents. Winter showed the highest occurrence of incidents while the next highest was summer. It was determined that operation of passenger ropeways at ski resorts – combined with the use of gas and electrical furnaces, boilers, heaters and other appliances for space heating – results in a higher number of incidents during the winter months. Summer is camping season, and the heavy use of portable propane appliances such as camp stoves, barbecues and lanterns corresponds to a rise in the number of incidents. Knowledge of this pattern is invaluable in determining the content and timing of public education programs.

FIGURE 1.1 2007-2009 INCIDENT PATTERNS



ENFORCEMENT IN 2009

FIGURE 1.2

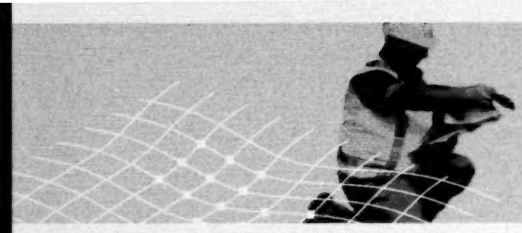
2009 ENFORCEMENT ACTIONS ACTIVITY BY TECHNOLOGY

ENFORCEMENT ACTIONS	AMUSEMENT RIDES	BOILERS, PRESSURE VESSELS AND REFRIGERATION	ELECTRICAL	ELEVATING DEVICES	GAS	PASSENGER ROPEWAYS	TOTAL
Compliance Order	0	9	229	7	63	0	308
Suspended Authorization and Permit Privileges	0	0	0	0	0	0	0
Suspended Authorization Privileges	0	0	0	0	0	0	0
Suspended Permit Privileges	0	0	40	0	[illegible]	0	42
Revocation of a Contractor's Licence	0	0	1	0	0	0	1
Suspension of a Contractor's Licence	0	0	0	0	2	0	2
Revocation of a Certificate of Qualifications	0	0	0	0	0	0	0
Suspension of a Certificate of Qualifications	0	0	1	0	2	0	3
Monetary Penalty	0	0	4	0	1	0	5

FIGURE 1.3

ENFORCEMENT ACTIONS 2006-2009

ENFORCEMENT ACTION	2006	2007	2008	2009
Compliance Order	120	173	286	308
Suspended Authorization and Permit Privileges	8	7	1	0
Suspended Authorization Privileges	5	9	7	0
Suspended Permit Privileges	489	374	325	42
Revocation of a Contractor's Licence	1	3	0	1
Suspension of a Contractor's Licence	0	0	4	2
Revocation of a Certificate of Qualifications	1	2	1	0
Suspension of a Certificate of Qualifications	0	1	3	3
Monetary Penalty	1	0	5	5
Total Number of Enforcement Actions	**625**	**569**	**632**	**361**



EFFECTIVENESS OF ENFORCEMENT ACTIONS FOR BEHAVIOURAL CHANGE

The *Electrical Safety Regulation* requires permit holders to request an inspection within a period of 180 days after the permit is issued. If extra time is required to complete the installation, the permit holder must have the permit amended or it expires. In the past, safety officers would suspend a contractor's ability to obtain new permits until the expired permits were resolved. However, the Safety Standards Appeal Board[3] ruled that permit issuance suspensions could not be used to enforce the expired permit requirements. This is reflected in Figure 1.3 *Enforcement Activity 2006-2009*, with a drop to 42 in 2009 for *Suspended Permit Privileges*.

In 2009, safety officers began to use compliance orders to enforce the requirements for expired 180-day electrical permits and by the end of 2009, 40 compliance orders had been issued by electrical safety officers for expired permits. A study conducted on one geographical area where 11 compliance orders were issued found that nine contractors demonstrated a significant change in behaviour and had no expired permits on record after the compliance orders were issued, while the remaining two contractors did not demonstrate a change in behaviour.

Initial findings indicate that compliance orders are an effective enforcement tool for resolving this issue. These findings are preliminary as they are based on only a small sample in one area of the province. We will continue to monitor this issue to determine the effectiveness of the compliance order as a behavioural change tool over time.

INDUSTRY AND TECHNOLOGY ENGAGEMENT

The BC Safety Authority collaborates with British Columbians to enhance the safety of technical systems, products, equipment and work in all of the regulated technologies. We work with industry associations on initiatives in each technology, with the common goal of public safety. We also continue to participate in national codes and standards committees in order to maintain the foundation of technical safety. The organizations and committees in which the BC Safety Authority actively participated during 2009 are listed in each technology report.

3 The Safety Standards Appeal Board is an adjunctive tribunal and is independent of any regulating body responsible for administering the provisions of the *Safety Standards Act* and the *Homeowner Protection Act* and any regulated industry. The Safety Standards Appeal Board's purpose is to resolve appeals from decisions made under the referenced Acts to determine if the decisions were fairly made in accordance with the provisions of the legislation. For more information, please visit their website at www.housing.gov.bc.ca/ssab/.

Our Technologies

At the BC Safety Authority, we regulate seven technologies. We assess new as well as operating equipment, issue licences to contractors and issue certificates of qualification to workers. In 2009, we completed more than 69,000 assessments. We have on register more than 8,200 licensed contractors across all technologies and almost 63,000 individuals with certificates of qualification.

Amusement rides: We are responsible for verifying the safe installation and operation of more than 370 amusement rides in British Columbia, including rides operated by travelling amusement (carnival) companies that move between provinces.

Boilers, pressure vessels and refrigeration: We oversee the design, construction and operation of steam and hot water boilers, refrigeration units and pressure vessels throughout the province. We license contractors who install and repair this equipment, and certify power engineers who operate them.

Electrical: We are responsible for overseeing electrical installations at commercial, industrial and residential sites throughout British Columbia, except in those areas where the municipalities provide inspection services.[4] We administer a licensing program for all electrical contractors in the province and certify all Field Safety Representatives,[5] authorizing them to accept the responsibility for ensuring that electrical contractors complete their work in accordance with the *Electrical Safety Regulation*.

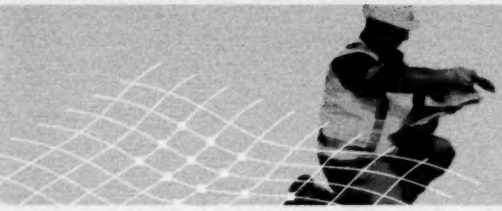
Escalators and elevators: We oversee the safety of passenger elevators, freight elevators, escalators, moving walks, lifts for individuals with physical disabilities and construction hoists in the province. Our staff conduct design reviews, field verifications of new installations and risk-based inspections of existing units. We also register the contractors who work on elevating devices equipment.

Natural gas and propane: We are responsible for overseeing the safe use of natural gas and propane, and digester, landfill and hydrogen gases at commercial, industrial and residential sites. We certify all gas trade professionals and license all contractors in British Columbia. Inspections of installations generally categorized as residential sites[6] are done by some municipalities;[4] however, we conduct inspections of all other gas equipment in the province.

Passenger ropeways: We regulate tramways, gondolas, chairlifts, T-bars and tow ropes across the province. In addition to conducting safety inspections of new and existing units, we also work with industry associations and educational institutions to deliver safety training programs to passenger ropeway operators.

Railways: We regulate provincially certified railways operating in British Columbia through a compliance program consisting of audits and inspections to certify that railways conduct their operations safely. These railways include common carrier railways, industrial railways, heritage railways and commuter railways.

4 See *Appendix A* for a complete listing of municipalities that administer portions of the *Safety Standards Act*.
5 A "Field Safety Representative" is an individual who holds a certificate of qualification issued under the *Safety Standards General Regulation*.
6 Not exceeding 14 kPa pressure or a load of 120 KW.



Incidents Summary

Incidents reported to the BC Safety Authority are classified and analyzed based on their severity. Railway incidents are the exception because, unlike the other technologies, provincial railways are administered under the *Railway Safety Act*. An agreement between the Province of British Columbia and the Transportation Safety Board of Canada has established federal reporting requirements for railways. This means commuter and industrial railway incidents are reported to the BC Safety Authority, but the incidents have not been classified by severity.[7]

REPORTED INCIDENTS

The BC Safety Authority received reports of 504 incidents in 2009. Of that total, 338 were directly related to regulated equipment or operations. Of the 116 reported incidents that were not related to either the equipment or operations we regulate, 93 were reported by commuter railways.[8]

FIGURE 1.4

INCIDENT NOTIFICATIONS BY TECHNOLOGY

TECHNOLOGY	INCIDENT NOTIFICATIONS RECEIVED BY BCSA
Amusement Rides	6
Boilers, Pressure Vessels and Refrigeration	7
Electrical	135
Elevating Devices	20
Gas	56
Passenger Ropeways	103
Railways	177
TOTAL	**504**

7 More recently, on December 1, 2009, the reporting structure for provincially regulated common carriers changed. Common carrier railways in British Columbia must report all accidents and incidents to the BC Safety Authority instead of the Transportation Safety Board of Canada. Through this reporting process, the BC Safety Authority will provide the outcomes and figures obtained to the Transportation Safety Board of Canada.

8 In accordance with federal reporting requirements, commuter railways are required to report all incidents that occur on railway property and not just those incidents directly related to railway operations.

COMPARING 2009 WITH PREVIOUS YEARS

We received 504 incident notifications in 2009, an 11% increase from 456 notifications in 2008. Despite this increase, after investigation, the number of incidents directly related to regulated equipment or operations was down 6% from 359 in 2008. An increase in incident notifications is positive as the number of incident notifications received partially reflects the industry's focus on safety and dedication to capturing safety statistics for prevention purposes, as well as its knowledge of reporting requirements. A technology with an effective safety management system should report approximately 100 more incidents with no injury, than incidents with severe (or major) injury.[9]

FIGURE 1.5 INCIDENT NOTIFICATIONS 2006-2009

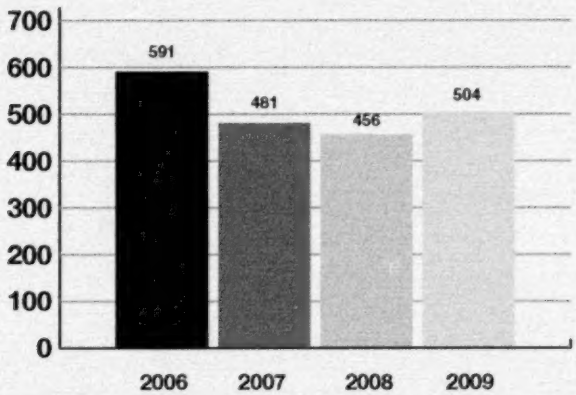
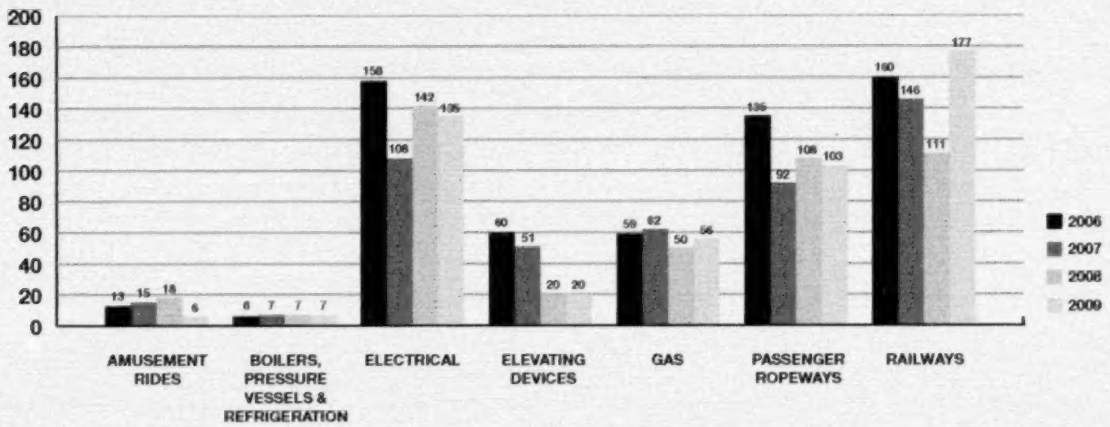


FIGURE 1.6 2006-2009 INCIDENT NOTIFICATIONS BY TECHNOLOGY



9 In 1931, H.W. Heinrich reported on a study of accidents that he classified according to severity. His report showed that for each serious-injury incident, we could expect about 29 minor injuries and 300 near-miss or property-damage incidents.

FATALITIES AND INJURIES

Injuries are classified by severity, according to whether the following indicators are present:

- long-term impairment of body functions or loss of function,
- significant physical pain and some disability,
- professional medical attention is required, and
- any residual effect.

Injuries resulting from incidents are summarized as minor, major or fatal based on their classification. Non-permanent injuries that may require some medical (first aid) treatment are classified as *minor injuries*. This includes lacerations, contusions, abrasions or any other injuries that have no residual effect. A *major injury* involves long-term impairment of function, or loss of function of any body part, organ or mental faculty. This includes fractures, internal injuries or wounds that are serious but not life-threatening, and psychological trauma that results in some temporary or partial disability. Medical attention is required. Injuries are not recorded in cases where an investigation ruled out regulated equipment as the cause of the incident.

In 2009, there were 129 injuries and six fatalities reported. Of the 129 injuries, 91 (71%) were minor injuries. The major injuries were fractures, second degree burns and exposure to carbon monoxide.

There were three incidents resulting in fatalities reported in each of the electrical and gas technologies. Of the six fatalities, four remain under investigation. One fatality was attributed to the deliberate misuse of gas equipment, while the cause of the remaining incident resulting in a fatality could not be determined after investigation.

Fatalities have a profound emotional impact on all involved. The BC Safety Authority is committed to assisting other authorities in their investigations into the circumstances of a death to prevent future deaths in similar situations.[10]

10 The facts of all sudden or unexpected deaths must be ascertained and clarified by the Coroners Service of BC to determine how, when, where and by what means the death occurred. The BC Safety Authority continues to strengthen working relationships with both the Coroners Service of BC and the BC Office of the Fire Commissioner to improve our investigation assistance.

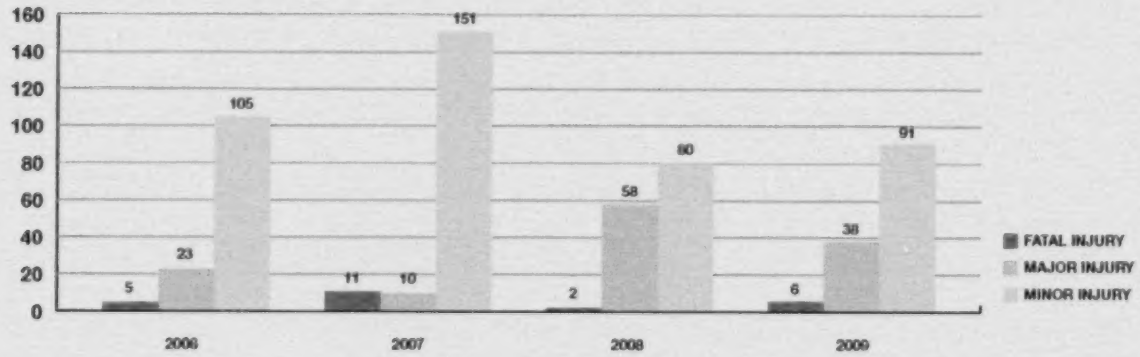
SUMMARY OF INJURIES SUSTAINED IN 2009 BY TECHNOLOGY

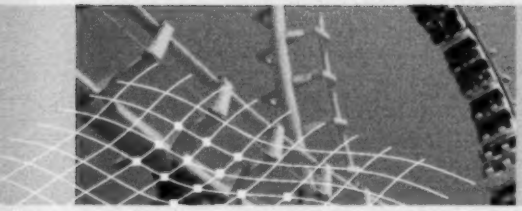
FIGURE 1.7

REPORTED INJURIES BY TECHNOLOGY

TECHNOLOGY	TYPE OF INJURY REPORTED			
	Minor	Major	Fatality	Total
Amusement Rides	5	1	0	6
Boilers, Pressure Vessels and Refrigeration	1	1	0	2
Electrical	15	10	3	28
Elevating Devices	13	0	0	13
Gas	7	20	3	30
Passenger Ropeways	50	6	0	56
Railways	DATA NOT AVAILABLE	DATA NOT AVAILABLE	DATA NOT AVAILABLE	DATA NOT AVAILABLE

FIGURE 1.8 2006 – 2009 INCIDENT NOTIFICATIONS INVOLVING INJURY





Amusement Rides

The BC Safety Authority oversees the safety of amusement ride installation and operation in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*. The types of regulated amusement rides range from small, single flume waterslides in hotels and inflatable play equipment to large major rides such as roller coasters operating at the Pacific National Exhibition. Small train rides such as the Stanley Park Train are also included within the amusement ride technology.

SUMMARY

In 2009, education and inspection continued to be the primary focus in the Amusement Rides Safety Program. Educating contractors on the possibility of and types of enforcement actions helped to encourage their compliance.

Throughout the year, we continued to identify amusement ride operators who were not participating in the safety system. Continued research identified operators of inflatable amusement devices who were operating outside the regulatory requirements. Going forward, safety officers will continue to focus on identifying these non-compliant companies with the aim of bringing them into the safety system.

As predicted in 2008, there was an increase in the number of ziplines in the province. The BC Safety Authority became a national proponent of the development of standards for designing, operating and maintaining these devices and successfully persuaded the American Standards for Testing and Materials F24 committee (ASTM F24) to form a task group to begin this important work.

Jason Gill
Amusement Rides & Passenger Ropeways Safety Manager

INSPECTION ACTIVITY IN 2009

FIGURE 2.1 AMUSEMENT RIDES INSPECTIONS PERFORMED (2005-2009)

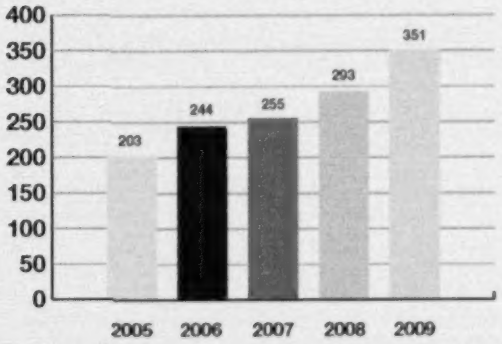
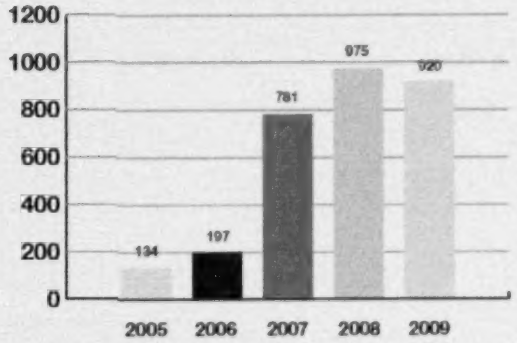


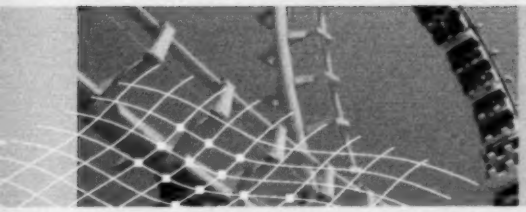
FIGURE 2.2 AMUSEMENT RIDES NON-COMPLIANCES FOUND ON INSPECTION (2005-2009)



Amusement rides safety officers conducted 351 inspections in 2009, a 19% increase over the previous year. This was partially a result of the registration of more amusement rides, which had increased to 386 in 2009 from 373 in 2008. In addition to inspection activities, safety officers continued to assist the amusement ride industry in the registration of rides.

After receiving more extensive and specialized training for accreditation from the National Association of Amusement Ride Safety Officials in 2006, safety officers have identified greater numbers of non-compliances since 2007. The continued focus on identifying unlicensed amusement rides and bringing them into the safety system has also contributed to the increase in the number of non-compliances identified.

In 2009, the BC Safety Authority brought on additional resources to assist in inspections during the busy amusement ride season, managing seasonality and continuing the process of identifying unlicensed contractors, especially in the inflatable amusement device category.



There was a 14% increase in the number of licensed contractors from the previous year, which brought the total to 157. We estimate approximately 95% of the industry is now licensed by the BC Safety Authority and we will continue our ongoing education efforts to bring amusement rides into compliance with the *Safety Standards Act* and applicable regulations.

Eleven new zipline installations received installation permits in 2009. Acceptance inspections were completed on only two of these devices, while the other nine were not ready for inspection due to construction delays. Safety officers continue to inspect these devices to the Canadian national standard[11] for amusement rides. To support our clients, work continues on the development of a policy to address specific design and operational issues for these devices, and it is anticipated that this will be in place by the end of 2010.

INCIDENTS IN 2009

FIGURE 2.3
INVESTIGATION OUTCOME OF REPORTED CASES

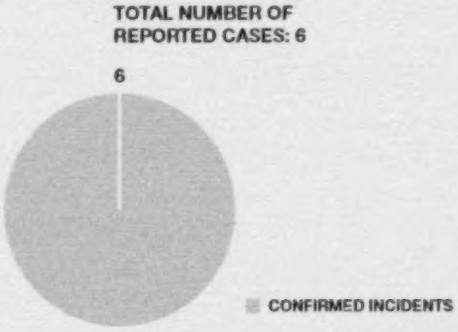
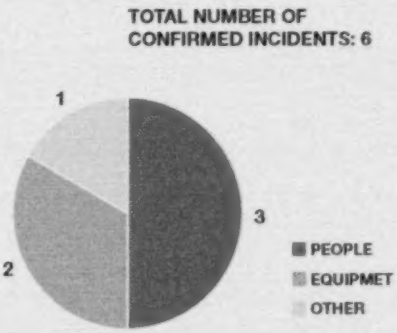


FIGURE 2.4
INCIDENTS BY IDENTIFIED CAUSE



In 2009, six amusement ride incidents were reported to the BC Safety Authority: one individual sustained serious injury and five others sustained minor injuries. The one serious injury took place on an alpine slide device[12] where the rider dislocated a shoulder. An incident investigation attributed the injury to inappropriate rider behaviour due to failure to reduce speed on a corner and not adhering to instructions on posted signage.

Of the six incidents reported, rider error was the cause of two incidents, and one incident was attributed to ride operation. In one instance, a rider on a travelling amusement (carnival) ride failed to hear both the instructions from a pre-recorded safety message and the verbal instructions from the operator. The rider fell on the ride platform, losing four teeth.

During regular inspections, safety officers continue to review the contractors' communications protocols to ensure they adequately address rider safety issues. Every year, we issue public safety reminders to increase awareness and remind those who use amusement device attractions to be alert to the safety information conveyed on posted signage and in pre-recorded messages.

11 Canadian Standards Association CAN/CSA Z267-00 - Safety Code for Amusement Rides and Devices.
12 An alpine slide device is a flume ride where riders are in a directional steel flume on wheeled carts that have braking capabilities.

IMPROVING PUBLIC SAFETY

As a result of a 2008 presentation to the BC Association of Agricultural Fairs and Exhibitions by the provincial safety manager, we saw an increase in awareness of the BC Safety Authority's role in the amusement ride industry. Members of the Association contacted us to become contractors, to register their inflated amusement rides and to participate in the safety system. When they hire amusement device companies for their fairs and events, they now know to check for the required licensing and permits.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Amusement Rides Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- BC Association of Agricultural Fairs and Exhibitions
- Pacific Northwest's Showman's Club

National Codes and Standards Committees

- Canadian Standards Association CSA Z267-00 Safety Code for Amusement Rides and Devices
- American Standards for Testing and Materials F24 Committee

FUTURE OUTLOOK AND TRENDS

The anticipated growth in tourism as a result of the 2010 Olympic Winter Games will likely increase the number of amusement device attractions in British Columbia. We expect an increase in the number of installation permits issued in 2010.

The harmonization of the Canadian Standards Association and the American Standards for Testing and Materials (ASTM) amusement device standards, which was scheduled for 2009, was delayed due to ASTM administrative voting issues. We anticipate completion in the fall of 2010. The BC Safety Authority continues its support of the harmonization of Canadian and American standards.

Boilers, Pressure Vessels and Refrigeration

The Boilers, Pressure Vessels and Refrigeration Safety Program oversees the construction, installation and operation of boilers, pressure vessels and refrigeration plants in accordance with the *Safety Standards Act* and the *Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation*. In addition to promoting the safe operation of this equipment, the BC Safety Authority reviews new boiler and pressure vessel designs prior to construction to ensure compliance with safety code requirements. Through the Boiler, Pressure Vessels and Refrigeration Safety Program, the BC Safety Authority also administers the licensing of contractors and certification of power engineers.

SUMMARY

In 2009, the activities of the Boilers, Pressure Vessels and Refrigeration Safety Program continued the shift in priorities that started in 2008. We are concentrating on higher risk inspections and education, as well as increased enforcement with the goal of decreasing permit avoidance and ensuring all regulated work is done by licensed contractors.

In addition to inspections of new and operating equipment, we made improvements to the Risk Assessment Program that allowed us to target high-risk equipment for inspection. Extensive assessments of tanks at large propane storage facilities took place in the wake of a catastrophic incident in Ontario where there were two fatalities.[13] Safety officers also provided on-site assistance to various clients to address safety issues with newly installed or operating equipment.

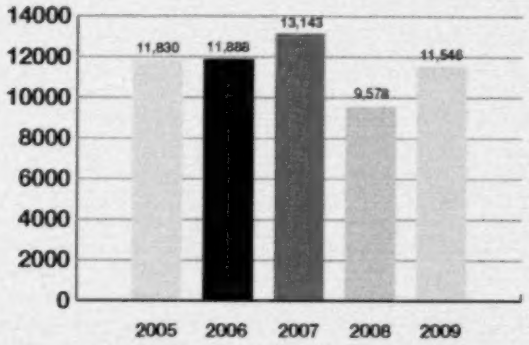
As we move forward into 2010, the Boilers, Pressure Vessels and Refrigeration Safety Program will continue to work on changes to the regulations so that global developments in areas of green energy technology – such as biofuels – can be safely adopted for use in British Columbia.

Gord Stevens
Acting Safety Manager, Boilers, Pressure Vessels & Refrigeration

13 For more information, see pages 33 and 34 (Gas Safety Program).

INSPECTION ACTIVITY IN 2009

FIGURE 3.1 BOILER, PRESSURE VESSEL AND REFRIGERATION INSPECTIONS PERFORMED (2005-2009)



The number of annual operating permits increased to almost 58,000 in 2009, compared to 56,800 in 2008. Safety officers performed 11,550 inspections, up from 2008. This increase was due in part to the construction of facilities for the 2010 Olympic and Paralympic Winter Games, our commitment to reduce overdue inspections and an increase in our audit activity.

In 2009, there were 67 new companies that met the requirements to become licensed contractors under the *Power Engineers, Boiler, Pressure Vessel and Refrigeration Safety Regulation*.

As the Boilers, Pressure Vessels and Refrigeration Safety Program moves toward a risk-based focus on safety, our efforts will shift to an increase in Special Plant Registrations (Risk Assessed or General Supervision statuses), Safety Management Plans and Contractor Quality Control programs, as well as increased training and education.

INCIDENTS IN 2009

FIGURE 3.2
INVESTIGATION OUTCOME OF REPORTED CASES

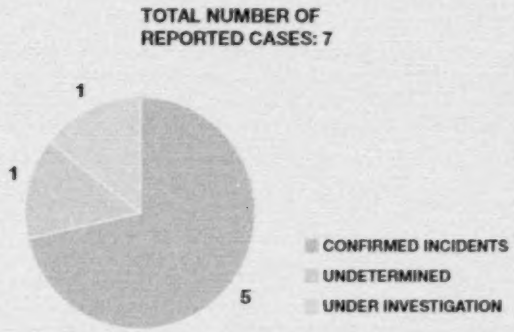
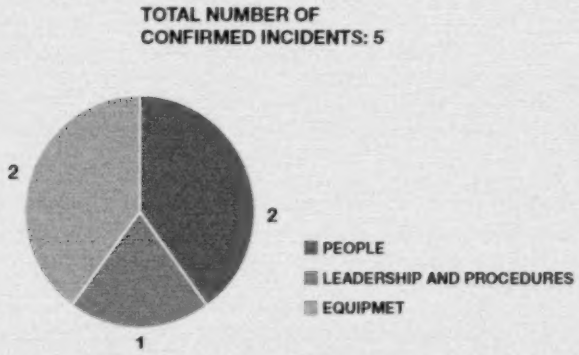


FIGURE 3.3
BOILER, PRESSURE VESSEL AND REFRIGERATION INCIDENTS BY IDENTIFIED CAUSE



Five confirmed incidents involving boilers, pressure vessels, pressure piping or refrigeration systems were reported in 2009, with two of them resulting in injuries. These two incidents were attributed to incorrect procedure (attempting to service a boiler while under pressure) and lack of operator knowledge (unqualified person working on regulated equipment).

In the incident attributed to incorrect procedure, a boiler operator attempted to repair a leak on a high pressure boiler that was reportedly under pressure. During repairs to the gauge glass isolation valve, the valve broke and released steam. The operator received second degree burns from flashing steam.

An unqualified person working on regulated equipment led to the other incident resulting in injury. In this incident, a boiler operator was testing a boiler's backup fuel oil system. The first attempted test to operate the boiler with oil failed. Fuel oil entered the boiler furnace during the failed test and created a flammable vapour mixture in the boiler. On the second attempt, the vapour ignited, causing a furnace explosion that resulted in damage to the boiler and first, second and third degree burns to the operator.

IMPROVING PUBLIC SAFETY

In 2009, we directed our efforts at two main subject areas: propane bulk storage facilities and improving our Risk Assessment Program. After an Ontario propane storage facility fire and explosion in August 2008, safety officers assessed the conditions and safety of pressure vessels used for propane storage at more than 60 propane facilities in British Columbia. The storage vessels were found to be in good condition and only minor non-compliances were discovered, which were then addressed by the owners.

Refining the Risk Assessment Program has been an ongoing effort in the boiler technology. The intent of this program is to use a science-based approach to identify higher-risk equipment among the almost 58,000 active units operating in the province. Factors used to determine risk included human occupancy of the facilities (for example, assisted living residences, schools, hospitals and commercial and industrial sites); the potential energy contained in the pressurized vessel determined by the equipment's operating pressure, temperature and volume; and hazards such as toxicity of the contents and equipment age.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Boilers, Pressure Vessels and Refrigeration Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- Applied Science Technologists and Technicians of BC
- Building Owners and Managers Association of BC
- The Institute of Power Engineers
- Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games

National Codes and Standards Committees

- National Board of Boiler & Pressure Vessel Inspectors
- Association of Chief Inspectors
- Standardization of Power Engineer Examinations Committee
- Canadian Standards Association CSA B51 Boiler, Pressure Vessels and Pressure Piping Code Technical Committee
- Canadian Standards Association CSA B51 Subcommittee
- Canadian Standards Association CSA B51 Parts 2 & 3 Technical Committee
- Canadian Standards Association CSA B52 Technical Committee
- Association of Chief Inspectors Technical Committee

FUTURE OUTLOOK AND TRENDS

We will continue to increase our efforts in the areas of education and enforcement that started in 2009, by way of reducing permit avoidance and ensuring qualified workers are performing the regulated work. We are also looking forward to the resurgence of British Columbia's manufacturing sector and providing guidance and assistance in helping clients return to full viability while maintaining safe operations of their regulated equipment.

Recent initiatives in green energy have started developments in the areas of bioenergy technology, improvements in efficiency by energy producers, and in community heating facilities and new boiler and pressure vessel installations in British Columbia. These developments are important and the BC Safety Authority will continue to work on improving regulation to adapt to the global changes in emerging green technologies.

Electrical

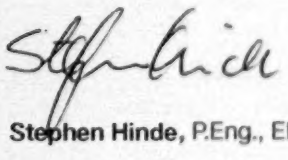
The Electrical Safety Program oversees the safety of electrical systems across British Columbia through the administration of the *Safety Standards Act* and the *Electrical Safety Regulation*. The BC Safety Authority is responsible for delivering electrical safety services for approximately 50% of the provincial permitting activity. Burnaby, Maple Ridge, North Vancouver (City and District), Surrey, Vancouver, Victoria and West Vancouver provide electrical safety services in their municipalities. The electrical safety services we deliver cover all types of electrical installations in residential, commercial and industrial sites.

SUMMARY

Several new education programs were developed in 2008 for the electrical contracting community to provide information on the safe installation of equipment, such as portable generators. These programs are a key part of our proactive safety strategy and were expanded in 2009.

Inspection remained an important component in 2009, as we focused on higher-risk activities such as high-voltage installations. A decrease in permit activity in 2009, however, led to a corresponding decrease in inspection activity.

Investigations of incidents reported to the Electrical Safety Program were the primary source of research information. As in 2008, fires were the majority of incidents investigated. In many cases, electrical equipment was either ruled out as the cause of the fire or the damage was too extensive to determine a definite cause. Injuries to workers due to inadequate safety procedures were also noted in many incidents, and we continue to provide education on safe electrical work practices to electrical contractors and work with training institutions to deliver similar information around safe work practices to electrical apprentices.



Stephen Hinde, P.Eng., Electrical Safety Manager

INSPECTION ACTIVITY IN 2009

FIGURE 4.1 **ELECTRICAL INSPECTIONS PERFORMED (2005-2009)**

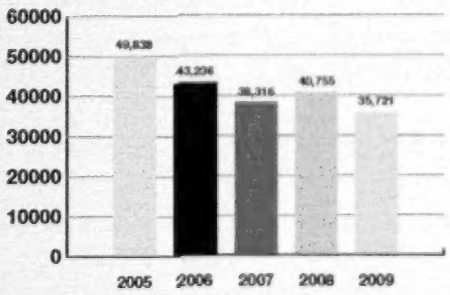
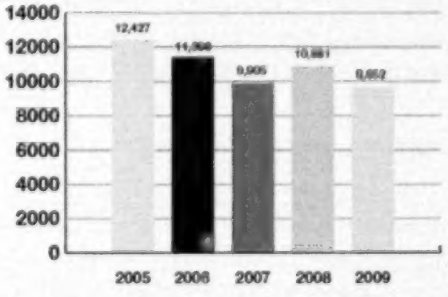


FIGURE 4.2 **ELECTRICAL NON-COMPLIANCES FOUND ON INSPECTION (2005-2009)**



In 2009, we issued more than 64,000 electrical installation permits. Our emphasis in 2009 remained on higher-risk installations. From these issued permits, our safety officers identified and inspected almost 36,000 as higher-risk installations, a 12% decrease from 2008. Analysis of "as-found conditions" reported by the safety officers in inspection reports, showed a very good rate of compliance for permitted work. Specifically, the as-found conditions show a 73% compliance rate on installation permits.

The number of inspection requests declined in 2009. This reflected the reduced complexity of the permits, as the predominant electrical work occurred in home renovations, not in large industrial installations. In other words, these smaller jobs required fewer inspections per permit.

INCIDENTS IN 2009

FIGURE 4.3
INVESTIGATION OUTCOME OF REPORTED CASES

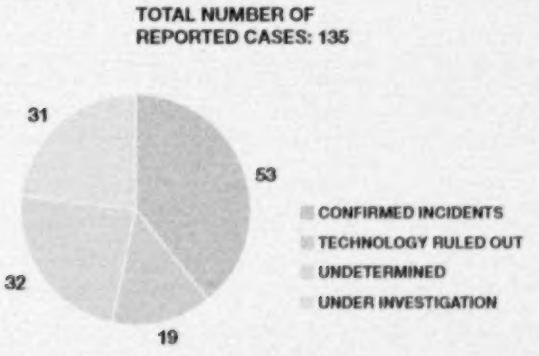
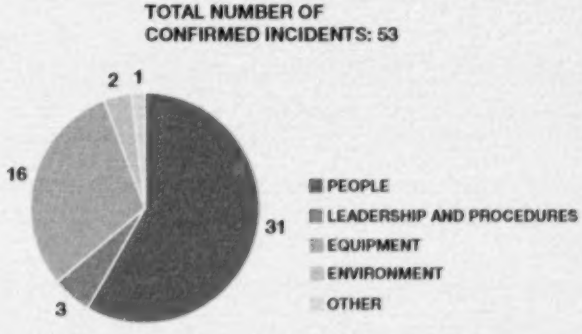


FIGURE 4.4
ELECTRICAL INCIDENTS BY IDENTIFIED CAUSE



In 2009, 135 incidents were reported to the BC Safety Authority that potentially involved electrical equipment. This figure was slightly lower than the previous year. Our investigations ruled out the involvement of electrical equipment in 19 of the reported incidents, while the exact causes in 32 cases could not be determined. Many of the undetermined causes were due to fire destroying evidence that would have allowed investigators to determine the causes of the incident.

The majority of electrical incidents were fires started by faulty equipment or equipment used in an inappropriate manner. The primary cause was due to people improperly using equipment, using electrical devices for unintended purposes or not maintaining equipment in good operating order. Some examples of these incidents include leaving operating heaters unattended, placing equipment too close to combustibles and overloading circuits. Many of these accidents occurred because people were not knowledgeable about proper operating, maintenance or safety precautions.

There were two incidents involving major injury consisting of electrical burns to workers where occupational health and safety procedures were not followed. The primary cause of injury was arc-flash.[14]

14 Arc-flash is a violent explosion caused by the extreme heat in electrical components from a short circuit condition.

There were three fatalities related to the use of electrical equipment: one fatality in each of three separate incidents. The investigation of the first fatality determined that an electrical heater being used for supplemental heat may have been the source of ignition of the house fire. In another fire investigation, an electric oxygen generator used by a person with a respiratory illness contributed to the start of a fire as it appears the patient was smoking while using the oxygen generator. There was no indication that damage to or failure of the electrical oxygen concentrator started the fire. The third death remains under investigation and preliminary reports indicate a suicide.

ELECTRICAL FIRES IN BRITISH COLUMBIA

Year after year, fire-related incidents account for the majority of the total incidents investigated by electrical safety officers. In 2009, more than 70% of all reported electrical cases involved fires.

Using reports received from July 2007 to December 2009 (a total of 385 incidents), we determined that 65% of the incidents occurred in residential buildings (both single-family dwellings and multi-family dwellings). Electrical involvement (as an ignition source) could be excluded from only 10% of the incidents. The majority of the fires (54% or 208 incidents) confirmed the involvement of the electrical technology and the cause was undetermined in the remaining 36%.

FIGURE 4.5
OUTCOME OF ELECTRICAL FIRES (JULY 2007-DECEMBER 2009)

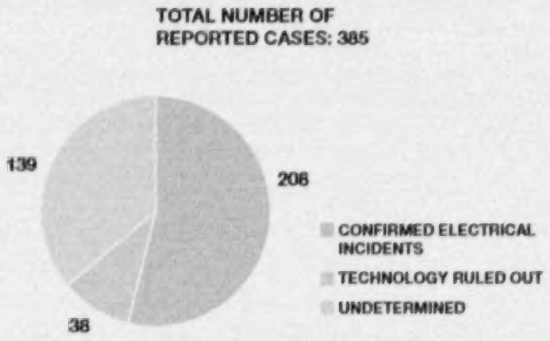
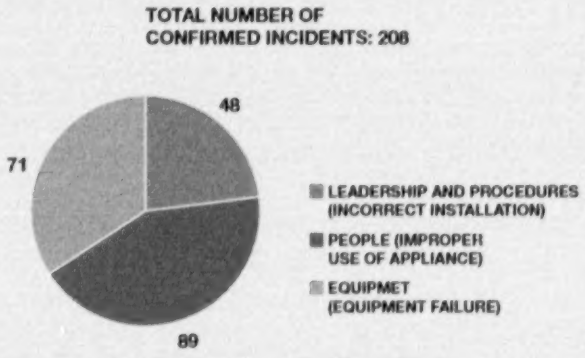


FIGURE 4.6
ELECTRICAL FIRES BY IGNITION SOURCE



This analysis confirms one of the risks faced by the electrical technology and reinforces the need to control user behaviour: incorrect installation, lack of maintenance and the improper use of appliances continue to be primary causes of electrical fires. Even with a limited dataset,[15] our findings are consistent with the research conducted by other organizations.[16] The BC Safety Authority will share this analysis with other jurisdictions. As well, we will use this research to prioritize both outreach efforts and our inspection processes.

IMPROVING PUBLIC SAFETY

The 21st edition of the Canadian Electrical Code, Part 1, was adopted as the BC Electrical Code with minimal amendment in August 2009, and came into full effect in October 2009. The new code

15 Many electrical fires are often unreported, and many incidents where the cause is "undetermined" may be electrical in nature. Investigating all types of incidents will further reveal areas of risk and the BC Safety Authority continues to improve incident reporting processes.
16 Electrical Safety Authority (2008 Ontario Electrical Safety Report) and Office of the Fire Commissioner (February 2010).

saw some significant changes to installation practices. Of particular note is the requirement for tamper-proof receptacles in dwelling units. These receptacles are designed to prevent small children from inserting objects into receptacles and exposing themselves to shock and burn hazards. A number of educational sessions with contractors and electricians were held to outline the changes in the new code.

The requirements for high voltage (in excess of 750V) systems in the BC Electrical Code provide general safety guidelines and not precise design rules; most high-voltage installations are complex systems that require formal engineering. For clarification, the BC Safety Authority also issued a directive[17] providing guidance on the intent, interpretation and application of the Code's requirements. The new directive outlines what design and test criteria must be submitted for approval, and provides a new guideline for overhead line construction.

The BC Safety Authority worked with service providers to the 2010 Olympic and Paralympic Winter Games. This high profile international event drew equipment and workers from the around the world, and it was important to ensure that the equipment owners were aware of British Columbia's safety standards and that the installations met these requirements. Facilities that were constructed for this event were built by licensed contractors under permit, and were inspected for code compliance.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Electrical Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- BC Electrical Association
- British Columbia Real Estate Association
- Electrical Contractors Association of BC
- Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games

National Codes and Standards Committees

- Canadian Advisory Committee on Electrical Safety - Canadian Standards Association Part 1
- National Public Safety Advisory Committee

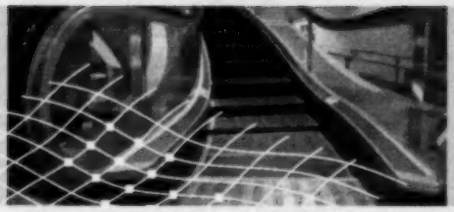
FUTURE OUTLOOK AND TRENDS

The volume of installation permits is expected to increase in 2010, particularly in the residential sector, as the province moves out of a recessionary period.

The importation of counterfeit and unapproved electrical products, a trend identified in 2008, remains a concern. This is a global issue and we will continue to work with other authorities and certification agencies to control the use of these potentially unsafe products.

For 2010, we are planning a review of the policies and procedures pertaining to operating permits to ensure appropriate risk assessments are performed on operating permits so that risk-mitigating strategies can be developed and implemented.

17 Directive No.: D-E3 090313 1 – High Voltage Systems. Date of issue: March 13, 2009.



Elevating Devices

The BC Safety Authority is responsible for overseeing the safety of elevators, escalators, moving walkways, dumbwaiters, lifts and construction hoists in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*.

SUMMARY

In 2009, inspection of operating permits was the primary activity for the Elevating Devices Safety Program. Compared to the previous year, we performed 12% more inspections and identified almost 60% more non-compliances. We also made the inspection process more efficient by introducing a checklist system for contractors/owners to follow before requesting an inspection by the BC Safety Authority.

Twenty incidents were reported to the BC Safety Authority, the same as in 2008. Several incidents that had occurred in 2008 led to the issuance of a number of safety orders in 2009. These incidents involved the failure of elevator components, and the safety orders mandated elevator contractors to address and correct the problems that caused the component failures.

In 2009, we also prepared to adopt the 2007 edition of the CAN/CSA B44 Safety Code for Elevators and Escalators in 2010, and we developed strategies for educating elevator contractors and building associations about the new Code.

Janice Lee, P.Eng
Elevating Devices Safety Manager

INSPECTION ACTIVITY IN 2009

FIGURE 5.1
ELEVATING DEVICES INSPECTIONS PERFORMED (2005-2009)

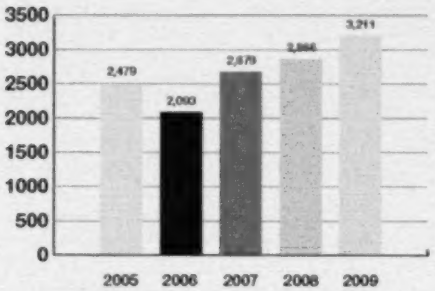
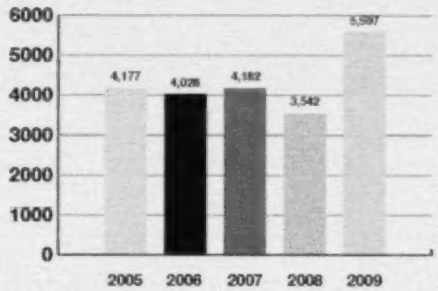


FIGURE 5.2
ELEVATING DEVICES NON-COMPLIANCES FOUND ON INSPECTION (2005-2009)



More than 30% of all inspections performed were on existing elevators and focused on high risk occupancy buildings such as hospitals.

In 2008, our approach for inspecting new installations was modified to focus on the education of contractors. This allowed safety officers to conduct inspections when the units were ready for final acceptance prior to operation, instead of conducting multiple inspections during installation. This approach improved compliance on new equipment and there was a drop in non-compliances in 2008.

In 2009, safety officers focused on the assessment of operating or in-service units. Although there were fewer non-compliances on new installations, more non-compliances were found when conducting inspections and assessments on in-service units. This inspection shift resulted in a 58% increase for non-compliances in 2009 over the prior year.

We developed a series of checklists for use by contractors, owners, elevating contractors and our safety officers. Before the safety officer arrives at a site for an inspection, the contractors must ensure that these three requirements are met:

- The inspection must have been booked up to three weeks, but not less than three days, before a safety officer arrives for the site visit.
- The general contractor or owner must have completed the BC Safety Authority's inspection checklist prior to a request for an inspection.
- The elevator contractor must have completed a regulation and code requirements checklist.

We have found these processes improve overall operational efficiency – for the BC Safety Authority and our clients. The process also helps contractors and owners to better understand what the BC Safety Authority expects in terms of meeting the provisions of the *Safety Standards Act*.

INCIDENTS IN 2009

FIGURE 5.3
INVESTIGATION OUTCOME OF REPORTED CASES

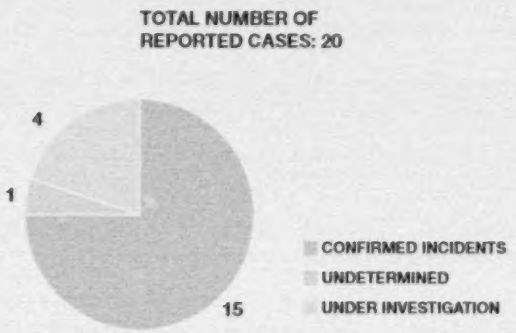
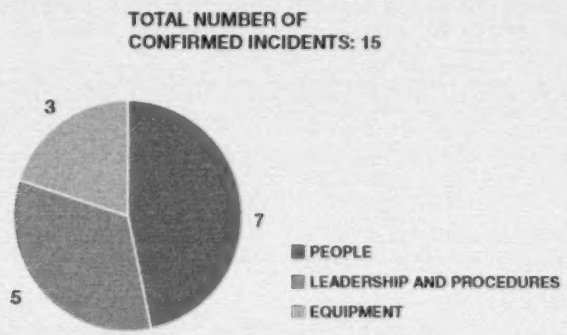
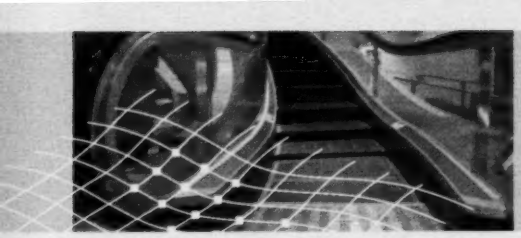


FIGURE 5.4
ELEVATING DEVICES INCIDENTS BY IDENTIFIED CAUSE





In 2009, there were 20 incidents reported to the BC Safety Authority. Based on these incidents and others in 2008, we issued four separate safety orders.

We issued a safety order in early 2009 as a result of a reported incident that involved the failure of a component on a hydraulic elevator. Although there were no reported injuries, we issued a safety order[18] to direct all contractors to inspect each one of their hydraulic elevators equipped with flexible hose assemblies for code compliance. The contractors had to immediately remove from service any elevator with a flexible hose assembly that was not in compliance to the required Code[19] specifications and notify the BC Safety Authority.

An incident that caused a fire in an elevator machine room led to another safety order.[20] As a result of the incident, we ordered all elevator contractors to retrofit Virginia Controls Traction Controllers in accordance with the manufacturer's recommended modification.

We also issued two safety orders that addressed the correct maintenance of brakes on electric elevators. One safety order[21] directs elevator contractors to maintain and test all driving machine brakes. The other safety order[22] requires contractors to test and correctly maintain all traction sheave brakes according to the manufacturer's recommendations.

The data from our inspections, along with the type of incidents reported to the BC Safety Authority, leads us to issue relevant safety orders and directives. The main intent is to modify contractor behaviours and to provide information to industry to improve public safety.

IMPROVING PUBLIC SAFETY

The adoption of the 2007 edition of the CAN/CSA B44 Safety Code for Elevators and Escalators, which includes the modernization of single bottom cylinders, is scheduled for 2010. Prior to 1980, the accepted industry standard for elevator hydraulic cylinders was a single bottom cylinder design buried in the ground. These cylinders were also installed without polyvinyl chloride casings, which made the cylinders susceptible to corrosion. Electrolytic action can cause the steel cylinder to corrode and burst, resulting in the expelling of the column oil that supports the elevator into the surrounding earth, and eventually causing the elevator to drop. Catastrophic incidents in other jurisdictions have caused serious injury or death, property damage and environmental contamination.

The 2007 edition of the Code requires a double bottom cylinder design. However, the Code is not retroactive, and the issue of single bottom cylinders will remain after the latest edition of the Code is adopted. To eliminate this risk, new Code prescribed options are as follows:

- Replace the cylinder with one that meets the current codes,
- Install a safety device called a life jacket/plunger gripper, or
- Install the same safety device and speed governor used on electric traction elevators that have steel rope or cables for suspension means.

As there is significant cost associated with this safety issue, we are giving owners and property managers time to evaluate their options, obtain capital and organize resources. Given the challenges associated with performing repairs to the large number of affected units, we plan on

18 Safety Order No. SO-L1 090128 1 – Flexible Hoses on Hydraulic Elevators. Date of Issue: January 28, 2009.
19 Canadian Standards Association CAN/CSA B44-00, Safety Code for Elevators and Escalators.
20 Safety Order No. SO-L1 090220 2 – Baldor AC Vector Drives on Virginia Controls Traction Controllers. Date of Issue: February 20, 2009.
21 Safety Order No. SO-L1 090607 3 – Driving Machine Brake – Electric Elevators. Date of issue: May 7, 2009.
22 Safety Order No. SO-L1 090601 4 – Tractions Sheave Break "Sheave Jammer" – Electric Elevators. Date of issue: June 1, 2009.

using a systematic method to enforce the Code requirement.

We presented this safety issue to the Building Owners and Managers Association in November 2009 as an educational initiative and also a means of consultation regarding the planned execution of the retrofit timeline. Further education sessions will continue in 2010 and we will present this information to other industry stakeholder groups.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Elevating Devices Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- Applied Science Technologists and Technicians of BC
- Association of Professional Engineers and Geoscientists of BC
- Building Owners and Managers Association of BC
- Canadian Elevator Contractors Association

National Codes and Standards Committees

- Association of Provincial Chief Elevator Inspectors
- Advisory Council on Elevating Devices
- Canadian Standards Association CSA-B44 Elevator Safety Code
- Canadian Standards Association CSA-B44 Elevator Safety Code Executive Committee
- Canadian Standards Association CSA-B44/ASME A171 Joint Elevator Safety Code
- Canadian Standards Association CSA-B44/ASME A17.5 Elevator & Escalator Electrical Equipment Code
- Canadian Standards Association CSA-B311 Manlifts Safety Code
- Canadian Standards Association CSA-B355 Lifts for Persons with Physical Disabilities Safety Code
- Canadian Standards Association CSA-Z256 (R2001) Safety Code for Construction Hoists
- Canadian Standards Association CSA-Z185 (Construction) Personnel Hoists Safety Code

FUTURE OUTLOOK AND TRENDS

Work on developing the mechanic certification program continued and will be ongoing for 2010. This program is necessary to ensure the workers performing regulated work have adequate knowledge and, more importantly, the qualifications to do so. The development of this certification program was supported by a 2008 report from the BC Coroners Service of BC.[23]

In general, inspections will continue to be our primary activity, with a focus on high risk occupancy buildings. We will also follow up with elevator contractors on the Code requirement for a double bottom cylinder design for elevators.

With the adoption of the 2007 edition of the CAN/CSA B44 Safety Code for Elevators and Escalators scheduled for 2010, we will continue to meet and consult with contractors and building associations regarding the new Code.

23. In 2007, the Coroners Service of BC investigated the death of an elevator mechanic. The Coroner's report, completed in 2008, recommended that the BC Safety Authority's proposed certification program be adopted.

Gas

The Gas Safety Program provides gas safety oversight to all industrial and commercial users of natural gas, propane, digester gas, landfill gas and hydrogen throughout British Columbia. We provide gas safety services for nearly 1.2 million homes. This figure excludes homes in Burnaby, Kelowna, North Vancouver (City and District), Richmond, Vancouver and Maple Ridge, where gas safety services are provided by local governments.

SUMMARY

In 2009, the Gas Safety Program continued with its risk-based approach to gas safety oversight, focusing its efforts on the higher safety risks identified through the Risk Assessment Program. This scientific approach continues to be refined and improved, allowing safety officers to assess and prioritize inspection requests and focus on the higher risks. This risk-based approach brought interesting and added challenges by way of the Terasen Whistler Gas conversion project and the preparations for the 2010 Olympic and Paralympic Winter Games. Due to the unique nature of both projects – and to address safety concerns not covered within the standard day-to-day practices – the Gas Safety Program entered into a number of Equivalent Standard Agreements, allowing flexibility for industry and at the same time maintaining an equivalent high standard of safety.

Having a risk-weighted inspection program has facilitated a shift in resources toward education and allowed safety officers the time to educate both gas contractors and fitters on the importance of safe gas fitting practices and regulatory compliance.

There were fewer compliance orders issued in 2009 than in 2008, and there were five instances where progressive enforcement actions were taken: two suspensions of gas contractor licences, two suspensions of an individual's qualification and one imposition of a monetary penalty.

As compliance issues still arise, enforcement work in 2010 is likely to include issuing safety orders, discipline orders and further compliance orders. In addition, strategic planning has started on targeted incident reduction programs for high risk areas such as carbon monoxide poisoning and misuse of portable propane appliances to increase the general public's knowledge about the safe use of portable propane equipment and proper maintenance of gas equipment. These education programs – combined with continued use of enforcement tools and inspection activities – will support the prevention of accidents.

Wayne Lock

Wayne Lock
Gas Safety Manager

INSPECTION ACTIVITY IN 2009

FIGURE 6.1 GAS INSPECTIONS PERFORMED (2005-2009)

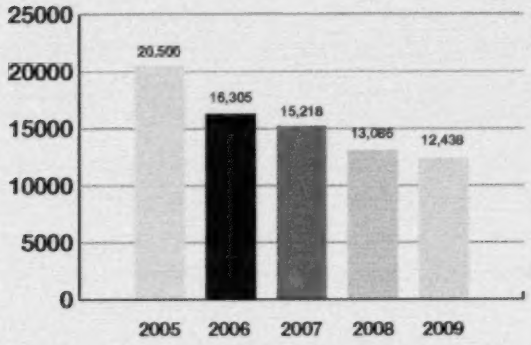
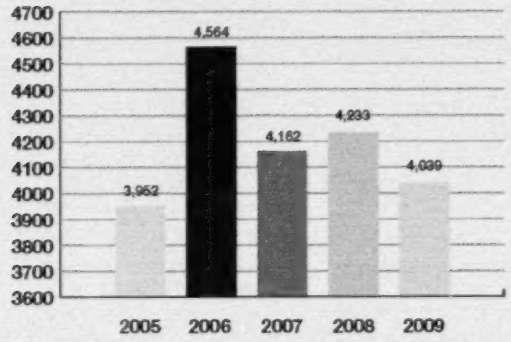


FIGURE 6.2 GAS NON-COMPLIANCES FOUND ON INSPECTION (2005-2009)

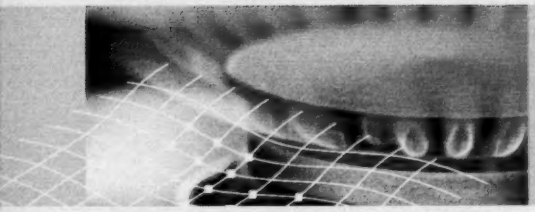


Gas safety officers carried out more than 12,400 inspections in 2009. Analysis of the "as-found" conditions reported by safety officers show a high rate of compliance for contractor, homeowner and operating permits, with a rate of compliance ranging from 89% to 93%. The highest risks were identified in miscellaneous inspections, which included hazard reports from contractors, homeowners and local government, audit, incident investigation and manufacturers' recall notices. We continue to shift the inspection and assessment processes to focus on these areas.

EQUIVALENCY

During the summer of 2009, the safety manager entered into an Equivalent Standards Agreement (ESA) with Terasen Gas for the conversion of 15,220 propane-fired gas appliances to natural gas throughout Whistler, BC. This agreement designated Terasen Gas to perform inspections on their converted equipment while the BC Safety Authority was responsible for audits of the inspection practices.

We assigned several gas safety officers to Whistler over the three-month project to assure an equivalent level of safety. Our gas safety officers monitored the work of the qualified gas fitters doing the actual conversion work and reported back to the utility's supervisory staff on their observations and findings. The feedback allowed the certified contractors performing the regulated



work to adjust their employees' behaviours and/or work practices to ensure the conversion was completed safely. The auditing process resulted in the safe conversion of more than 15,000 appliances in Whistler.

The Equivalent Standards Agreement approach benefited both the BC Safety Authority and Terasen Gas because of the lessons learned and experience gained. We also saw a positive shift in the behaviours of the gas fitters involved; the long-term effect is that they will take this knowledge and experience with them when performing future regulated work. On the whole, the large-scale project proved successful and provided us with valuable information to evaluate other projects that may require alternative safety approaches.

On an international level, PKL Group of the United Kingdom approached us to allow temporary installation of their equipment in Vancouver, BC for the 2010 Olympic and Paralympic Winter Games. The 200 pieces of portable kitchen and catering equipment were not certified for use in this country.

We agreed on an Equivalent Standards Agreement with PKL Group to allow the temporary installation and use of their equipment in Vancouver, BC and we ensured PKL Group addressed all safety risks before the equipment arrived in the province. It was necessary to send a safety officer to the United Kingdom to assess the equipment for equivalency to Canadian standards, and he attached a decal to each piece of equipment after it was approved. A condition of the Equivalent Standards Agreement was that PKL Group would remove the equipment after the 2010 Olympic and Paralympic Winter Games.

We also entered into another Equivalent Standards Agreement involving the operations of the two Olympic cauldrons at the 2010 Olympic and Paralympic Winter Games. During 2009, we worked with several agencies to agree on an acceptable Safety Management Plan that would allow the operation of such unique gas appliances. During the designing stages we met several times with WorkSafeBC, local government and fire departments to consider all the possible safety risks and hazards involved.

INCIDENTS IN 2009

FIGURE 6.3
INVESTIGATION OUTCOME OF REPORTED CASES

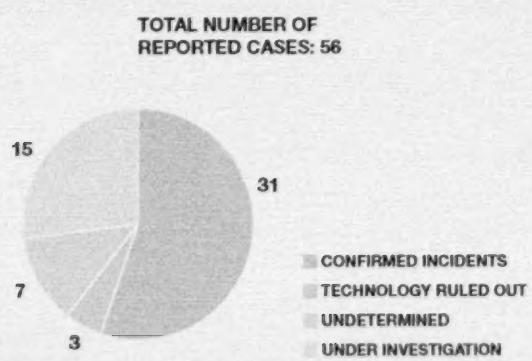


FIGURE 6.4
INCIDENTS BY IDENTIFIED CAUSE

The BC Safety Authority received 56 incident notifications involving gas equipment or gas systems in 2009. The majority of incidents were attributed to human behaviour, where the users and operators of gas equipment or appliances were inattentive or lacked adequate knowledge in the operation of regulated equipment.

Incident investigation data from 2007 and 2008 shows there is uncertainty as to who is responsible for ensuring gas equipment is safely operated. It was also observed that the accountability of landlords, building owners, property managers and gas contractors for gas equipment maintenance is unclear. In 2009, incorrect procedures (the failure to manage and adhere to established best practices) on operating gas equipment was the cause of 11 incidents. In four of these cases, minor gas leaks were reported as a result of equipment malfunction due to lack of maintenance. In 2009, a directive was issued to clarify the obligations of both gas contractors and building owners to ensure occupants are safe from hazards.[24]

There were three fatalities reported in 2009. In one incident, an explosion occurred after a release of natural gas into a home. The explosion and subsequent fire destroyed the home and caused damage to 26 surrounding homes. The incident resulted in one fatality of an adult male and minor injury to a child. The investigation revealed the cause of the explosion was the intentional misuse of the gas equipment.

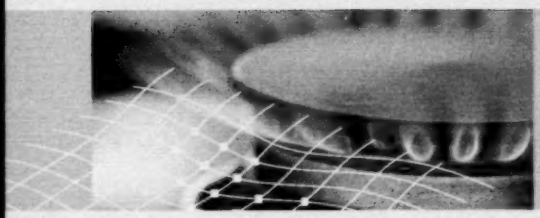
In another incident, the improper installation of a natural gas boiler appears to be the cause of carbon monoxide poisoning. One fatality was reported in this incident, as well as major injuries to another individual. Although this incident is under investigation, preliminary findings indicate that the incorrect installation and wiring of the boiler's venting system caused spillage of combustion products from the boiler into the residence. The investigation will continue into 2010.

The third incident, which is still under investigation, involved a gas fitter servicing a residential gas boiler. This incident resulted in a fatality but the cause has yet to be determined.

IMPROVING PUBLIC SAFETY

In 2008, a large propane explosion occurred near Toronto, Ontario. The explosion resulted in two fatalities, fire and extensive damage to the site and surrounding area. Following the incident, the BC Safety Authority conducted a review of propane safety in BC. As well, the Province of Ontario commissioned a review of its provincial propane safety regulations and comparisons to established best practices. After the Ontario Propane Safety Review released its recommendations, the BC Safety Authority reviewed each recommendation for its relevance and applicability to British Columbia. This analysis was carried out to compare the safety systems in place in British Columbia to recognized best practices. The BC Safety Authority's analysis concluded that the majority of the recommendations are applicable to our areas of responsibility for propane safety. A few of the recommendations are directed towards improving coordination with other safety agencies, local governments and fire departments. Throughout 2009, the BC Safety Authority followed up on these recommendations with these other agencies.

24 Directive No.: D-GS 091104 5 – Responsibilities of Building Owners and Gas Contractors. Date of issue: November 4, 2009



For example, one of the recommendations was that the authority having jurisdiction, as well as various industry and interest groups, work together on a propane safety and awareness program. In response to this recommendation, the BC Safety Authority's Gas Technical Committee sponsored a joint root cause analysis with the Office of the Fire Commissioner and the Coroners Service of BC to examine ways of preventing incidents due to the improper use of propane. In 2009, this joint team completed the root cause analysis and will share its findings with industry and other interested groups in 2010.

Another recommendation involved more in-depth training for first responders (emergency personnel) and those inspecting propane facilities. Although the BC Safety Authority's gas safety officers are already trained and qualified, gas safety officers received additional training for the inspection of propane facilities and propane bulk plants in 2009. The BC Safety Authority's training material was also made available to the Office of the Fire Commissioner for its use. BC Safety Authority staff also worked with the Propane Training Institute to create a propane awareness course designed specifically for firefighters and first responders. This course was developed and launched in 2009 to establish a consistent approach to propane-related incidents, leading to enhanced public safety.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Gas Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- Applied Science Technologists and Technicians of BC
- BC Common Ground Alliance
- Building Owners and Managers Association of BC
- Construction Industry Training Organization
- Coroners Service of BC
- Gas Industry Safety Advisory Committee
- Independent Contractors and Businesses Association of BC
- Industry Training Authority
- Thermal Environmental Comfort Association
- Mechanical Contractors Association of BC
- Office of the Fire Commissioner
- Propane Gas Association of Canada
- Ontario Propane Safety Review Panel
- Refrigeration Facilities Association of BC
- Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games

National Codes and Standards Committees

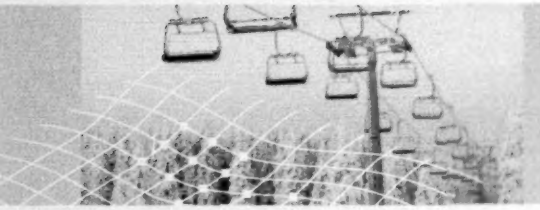
- Inter-provincial Gas Advisory Committee
- Canadian Standards Association CSA B149 Technical Committee
- Five B149 Sub – Committees (Canadian Standards Association)
- Canadian Standards Association CSA Gas Appliance Technical Committee
- Canadian Standards Association CSA Z662 Distribution Sub-Committee
- Canadian Standards Association CSA Joint TC for Electrical/Gas on Fuel Cell Technologies
- Bureau de normalisation du Quebec BNQ H2 Installation Code
- Canadian Standards Association CSA Technical Committee for Residential Depressurization

FUTURE OUTLOOK AND TRENDS

While damage to underground gas installations continues to occur in British Columbia, compared to 2008 there was a 7% decrease in reported incidents causing damage to underground gas installations in 2009. At the same time, the volume of calls to BC One Call, a service that identifies the location of underground facilities, increased 10% from the calls received in 2008 to more than 96,000 calls in 2009. This increase appears to be in direct relation to the inspection, education and research project called *Can You Dig It?* which was developed by the BC Safety Authority to address damage to underground gas lines and delivered in 2008. This pattern indicated that more people are calling before starting underground work; although this is a small step in the right direction, BC One Call and BC Safety Authority hope a marked increase of calls to BC One Call continues.

In 2009, the BC Safety Authority continued to work with other safety regulators and industry stakeholders. Gas safety officers educated the public on a one-on-one basis and at the BC Common Ground Alliance's[25] *Dig Safe BC* seminars. One safety officer based in northern BC worked with the local utility and WorkSafeBC to improve the line hit incident notification process in the northern BC region. In the BC Safety Authority will work to improve the notification processes in the central and southern interior regions.

25 The BC Common Ground Alliance is a non-profit organization established to lead development of construction or excavation safety practices that prevent damage to underground infrastructure such as electrical and gas distribution systems, water and sewer pipes and communication cables to improve public and worker safety. The BC Safety Authority collaborates with other stakeholders (including construction associations, utilities and other safety regulators) providing both financial support and technical expertise to assist with the Alliance's programs.



Passenger Ropeways

The Passenger Ropeways Safety Program oversees the safety of the passenger ropeways throughout the province, including tramways, gondolas, chairlifts, rope tows and passenger conveyors. We inspect new, operating and modified units in accordance with the *Safety Standards Act* and the *Elevating Devices Safety Regulation*.

SUMMARY

The Passenger Ropeways Safety Program focused on the education and inspection pillars of the operating model. Our research indicates that falls from carriers involving young children continue to be an area of concern. In 2009, we continued the Rider Safety campaign and re-focused our efforts on educating those who ski and snowboard – the end-users of passenger ropeways and ski lifts – in an attempt to prevent fall from carrier incidents. This effort, however, did not yield the desired results as the number of falls from chairlift carriers increased slightly from 2008.

The integration of the operating model into our day-to-day operations continues to evolve; however, inspections remain our primary activity. Although incident investigations took precedence over all other activities, the inspection of installations related to the 2010 Olympic and Paralympic Winter Games were the priority in 2009.

The investigation into a 2008 gondola lift tower failure was a primary focus throughout 2009, which placed a major demand on our resources. A team, including representation from the research department, used a root cause analysis procedure new to the BC Safety Authority to analyze the investigation reports and develop strategies for preventing similar incidents. This ongoing investigation and analysis identified immediate necessary actions, which were implemented across the industry to ensure the safety of those riding on passenger ropeways. Publication of the final incident report is expected in 2010.

Jason Gill
Amusement Rides & Passenger Ropeways Safety Manager

INSPECTION ACTIVITY IN 2009

FIGURE 7.1 PASSENGER ROPEWAY INSPECTIONS PERFORMED (2006-2009)

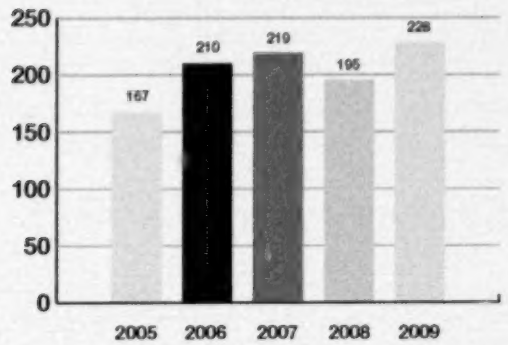
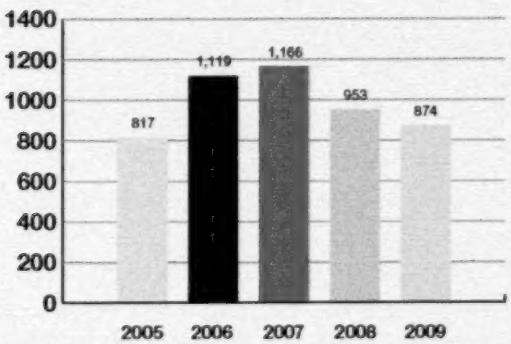
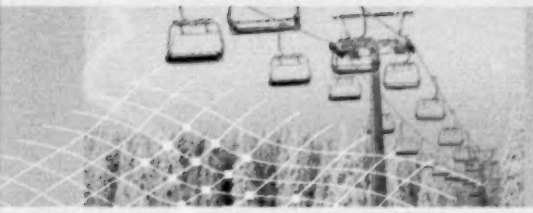


FIGURE 7.2 PASSENGER ROPEWAY NON-COMPLIANCES FOUND ON PERFORMED INSPECTION (2006-2009)



Safety officers conducted almost 230 ropeway inspections in 2009 and recorded more than 870 non-compliances. We had an 18% increase in inspection activity, due mainly to inspections of venues related to the 2010 Olympic and Paralympic Winter Games and the auditing of safety management plans. Auditing was a new type of inspection activity for this technology. We also had a decrease of 9% in identified non-compliances.



INCIDENTS IN 2009

FIGURE 7.3
INVESTIGATION OUTCOME OF REPORTED CASES

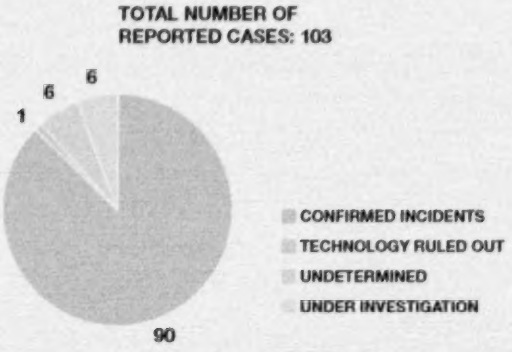
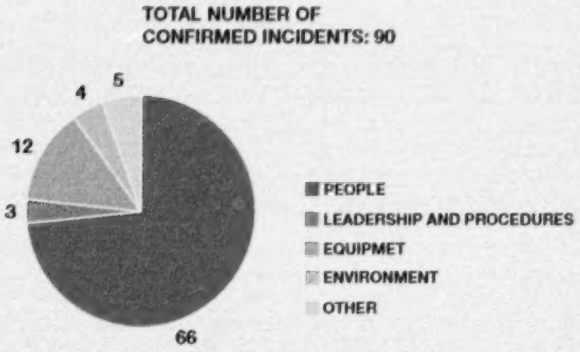


FIGURE 7.4
INCIDENTS BY IDENTIFIED CAUSE



In 2009, the BC Safety Authority received 103 reported incidents that included six major injuries and 50 minor injuries. One case where a rider lost consciousness due to a pre-existing medical condition prior to falling off the carrier was not attributed to the technology. The incident causes could not be determined in six incidents and these incidents were excluded from our analysis.

Similarly to previous years, most incidents occurred because of incorrect loading and unloading caused by improper rider behaviour, including not lowering safety bars or prematurely raising the safety bar, horseplay and entanglement with equipment. Accordingly, we increased our efforts to address falls and incidents in the loading areas through education and awareness programs.

In another incident, a 10-year-old female passenger suffered serious but non-life-threatening injuries when she was struck by the haul rope on a surface T-bar. This incident occurred as a result of sheave assembly[26] deropement. Our investigation, however, could not determine the exact cause. Possibly, a combination of an improperly graded towpath and a worn sheave liner contributed to the incident. To prevent reoccurrence, we put in place a restriction on the speed of the lift and a requirement to post a top station attendant.

There were three incidents involving sheave assembly bolt failures. No injuries occurred, but two of the incidents led to moderate damage to equipment. In each case, we obtained a metallurgical analysis of the bolts to better understand how they failed. We shared this information with the manufacturers of these installations to determine the best course of action to mitigate these types of incidents.

Two lift mechanics were involved in an incident when they tried to reposition the work carrier they were working from. One of the mechanics had his fall arrest harness lanyard still attached to a T-Bar tower and it pulled him out of the carrier. He became entangled in the equipment and the force caused the work chair hangar arm to fail. The other mechanic fell with the carrier while the first mechanic was left hanging from the tower by his lanyard. Since this incident led to a worker injury, WorkSafeBC led the incident investigation with our assistance for the technical aspects of the T-Bar installation.

26 A 'sheave assembly' is a series of rubber lined wheels that support and direct the path of the ski lift's wire rope.

IMPROVING PUBLIC SAFETY

In our continued effort to prevent falls from carriers, we developed a Safe Rider Program with our Education, Communications and Outreach department to increase the awareness of the skiing and riding public about the proper ways to ride above-surface ropeways, or chairlifts. BC Safety Authority staff conducted a pilot program during school spring break of 2009 where they engaged the public at local ski areas in Vancouver and provided handouts demonstrating safe riding behaviour. In the fall of 2009, the BC Safety Authority had a booth at the Vancouver and Abbotsford Ski Shows to increase awareness about safe riding behaviours. This program was well received by the Canada West Ski Areas Association; several ski areas throughout the province are using Safe Rider posters and handouts to increase awareness of rider safety.

INDUSTRY & TECHNOLOGY ENGAGEMENT

The Passenger Ropeways Safety Program worked with the following organizations and committees in 2009:

Industry Associations

- Canada West Ski Areas Association
- Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games

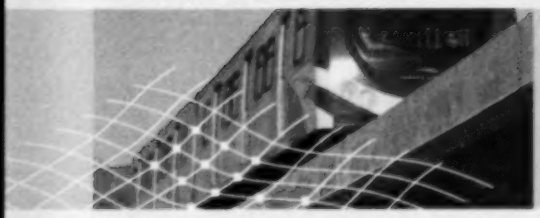
National Codes and Standards Committees

- Canadian Standards Association CSA-Z98 Technical Committee

FUTURE OUTLOOK AND TRENDS

One of the anticipated results of the 2010 Olympic and Paralympic Winter Games is a significant increase in the number of visitors to Vancouver and Whistler ski areas. All passenger ropeways at the Olympic venues received the required inspections. Our safety officers worked with representatives of the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games to ensure overlay construction for the games did not cause any operational impact on these installations.

The Passenger Ropeways Technology Committee began discussions about aging passenger ropeways in the province. In 2010, this committee will focus on research into the impact of the aging equipment and the best way to implement a program to ensure these installations continue to operate safely and comply with safety standards. The development of this program will involve consultation with all passenger ropeways stakeholders in British Columbia.



Railways

The BC Safety Authority regulates railway companies that operate solely within BC and have a Minister's Certificate issued by the BC Ministry of Transportation and Infrastructure. The Railway Safety Program is unique within the BC Safety Authority as it is the only technology not governed by the *Safety Standards Act*. Instead, provincial railways are subject to the provincial *Railway Act*, the federal *Railway Safety Act* and the adopted federal railway safety legislation. Railway companies that operate nationally, such as CN, Canadian Pacific and VIA Rail, are not under the jurisdiction of the BC Ministry of Transportation and Infrastructure but are regulated by Transport Canada.

The Railway Safety Program regulates four classes of railways: Common Carrier (e.g. Southern Railway of BC, transporting passengers or goods and interchange rolling stock with other railways); Industrial Railways (e.g. Eurocan Pulp and Paper, serving an industrial site exclusively); Commuter Railways (e.g. SkyTrain, transporting passengers between urban locations); and Heritage Railways (e.g. Kettle Valley Steam Railway, operating historical rolling stock).

SUMMARY

The year 2009 was successful for the Railway Safety Program in our focus on the education, outreach and inspection components of the operating model. Our railway safety officers delivered three educational programs to both railway operators and the public. This included a "Safe Rider" program in which we partnered with industry and stakeholders to deliver safety messaging to the rail-commuting public. As well, the Railway Safety Program completed a three-year audit of the design and construction of the new Canada Line railway operating from Richmond and the Vancouver International Airport to downtown Vancouver.

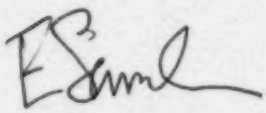
As auditing is the foundation of the Railway Safety Program it is important to note that every provincial railway received, at a minimum, one annual audit in 2009. These audits include reviews of a railway's operation and maintenance activities against its Safety Management System. The information gathered from these audits helps to form the future direction of the program. Audits and data collection from 2008 helped railway safety officers focus on railway safety concerns and develop proactive strategies. For example, in 2009 an audit of railway operating permits revealed that, in the past, exemptions were granted to the regulation for medical requirements for

employees in safety critical positions. A risk assessment was performed and it was determined that these exemptions should be withdrawn. Railway safety officers are currently working to ensure that the railways comply with the regulation and adopt this proactive approach to safety.

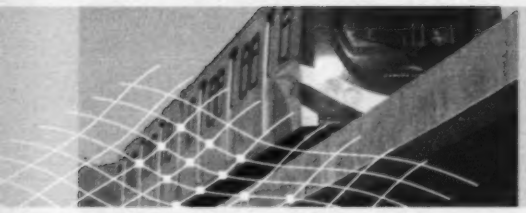
During 2009, we concluded the work on producing a set of regulatory manuals designed for each of the four railway classes operating within the province. We introduced these manuals as guidelines and provided them to industry. We then held consultation sessions on the guidelines before forwarding them to the Ministry of Transportation and Infrastructure for approval.

With all the successes in the Railway Safety Program, we also had our challenges. These included our efforts to identify railways working outside the safety system, as well as the review of the proposed design and construction of the new $1.4 billion Evergreen Line in 2010. We expect the latter initiative to place serious demands on our program's resources.

Looking forward, the Railway Safety Program will continue to improve by striving to maintain and establish relationships with industry clients and stakeholders, with the ultimate goal of reducing risk and improving railway safety in BC.



Eric Samuelson
Railway Safety Manager



INSPECTION ACTIVITY IN 2009

Our safety officers take a multifaceted approach to railway safety when assessing a railway's construction, operation and maintenance. We conduct audits and safety assessments to monitor a railway's operation and conformance to its approved Safety Management System. Depending on the size and complexity of the railway's operations, a single audit can extend over several days. Consequently, the Railway Safety Program records its activities in terms of hours rather than by the number of inspections.

In 2009, we spent more than 3,500 hours performing audits on 74 provincial railways, which varied from small simple assessments to sophisticated audits. As well, we concluded a three-year audit of the new Canada Line commuter railway line that operates between Richmond and downtown Vancouver. Additionally, we continued to focus on capturing unregulated work throughout the railway industry. Our railway safety officers certified eight new operating railways to ensure each railway had developed and implemented a Safety Management System.

ACCIDENTS AND INCIDENTS IN 2009

All classes of provincial railways were required to report accidents and incidents in accordance with federal regulations. Unlike the reporting methods used by other technologies regulated by the BC Safety Authority, the federal requirements use both the terms "accident" and "incident" to report events that caused injury, damage or created a risk of injury or damage.

Industrial railways reported 27 accidents and incidents. Of this total, 14 were slow speed derailments caused by equipment or procedural problems; however, these events did not cause equipment damage nor did they have any adverse environmental impact. There were also no occasions where a railway employee or a member of the public sustained injuries.

Commuter railways were required to report accidents and incidents that occurred on railway property, in which there were 93 reported incidents in 2009. Our railway safety officers determined none of the reported accidents or incidents were caused by railway rule violations, inadequate operating procedures or equipment failures. The majority of these incidents were due to slips, falls and trips on commuter rail property (including station parking lots, entrances and platforms) and resulted in minor injuries.

Heritage railways reported three incidents to the BC Safety Authority. We attributed rule violations to two of the incidents while the third was a collision with a tour bus on a railway property. There were no injuries reported.

Since December 1, 2009, Common Carrier railways were required to report incidents to the BC Safety Authority instead of the Transportation Safety Board of Canada. There were four incidents reported between December 1, 2009 and December 31, 2009. Two of the incidents were slow speed derailments caused by equipment or procedural problems. These events, however, did not cause equipment damage or adverse environmental impact. The remaining two incidents were collisions at railway crossings.

IMPROVING PUBLIC SAFETY

In 2009, we delivered our annual educational programs and consultation on technical issues to encourage railway clients to participate in the safety system. We also continued with our town hall meeting program having 29 operators from all classes of railways in three cities throughout the province (New Westminster, Prince George and Cranbrook) attend meetings to discuss railway service provider relationships, medical requirements for safety critical positions, railway fees, accident reporting, educational opportunities and the future of the Railway Technical Committee.

During the town hall meetings and railway assessments, we spent considerable time educating clients on the need to report railway accidents and incidents. We also informed clients that their failure to report these events severely hampers our ability to carry out trend analysis in support of future accident prevention initiatives.

We further increased the education and skills of our staff. In 2009, our safety officers completed accident investigation and hazardous materials training with Transportation Safety Board staff in order to consistently assess provincial railway operations.

INDUSTRY & TECHNOLOGY ENGAGEMENT

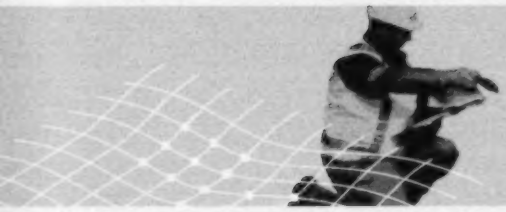
The Railway Safety Program worked with the following organizations and committees in 2009:

- Ministry of Transportation and Infrastructure
- Railway Association of Canada
- Transportation Safety Board of Canada

FUTURE OUTLOOK AND TRENDS

In 2009, we reached a milestone by completing our work on regulatory review for all classes of provincial railways and submitted it to the Ministry of Transportation for approval. We anticipate the reviewed material, or "railway canons," will serve as best practices for the railway industry in BC.

The Railway Safety Program continues to develop a database to specifically collect railway statistics. For two years, railway safety officers have been adding information into the database system, which should be fully operational in 2010. The system will provide us with the tools needed to perform trend and root cause analysis and allow us to focus on the causes of railway accidents and incidents.



APPENDIX A:
MUNICIPALITIES THAT ADMINISTER PORTIONS OF THE *SAFETY STANDARDS ACT*

MUNICIPALITIES THAT ADMINISTER THE *ELECTRICAL SAFETY REGULATION*

The BC Safety Authority oversees electrical safety throughout British Columbia, with the exception of the following municipalities:

- City of Burnaby
- City of North Vancouver
- City of Surrey
- City of Vancouver
- City of Victoria
- Corporation of the District of Maple Ridge
- District of North Vancouver
- Municipality of West Vancouver

MUNICIPALITIES THAT ADMINISTER THE *GAS SAFETY REGULATION*

The BC Safety Authority oversees gas safety throughout British Columbia, with the exception of the following municipalities:

- City of Burnaby
- City of Kelowna
- City of North Vancouver
- City of Richmond
- City of Vancouver
- Corporation of the District of Maple Ridge
- District of North Vancouver

Note: Municipalities administer gas inspection programs for detached dwellings with gas services at a pressure of 14.0 kPa gauge or less as well as other building with gas services at a pressure of 15.0 kPa gauge or less and with a total connected load for the meter of 120 kW or less.

DEFINITIONS

CONSULTATION DEFINITIONS

Ad hoc Issue Group: A group of industry subject matter experts formed to address a specific issue, activity or project toward a specified outcome. The ad hoc issue groups report quarterly to the Technology Committee and may be dissolved when the outcome is delivered.

Technology Committee: Non-decision-making bodies made up of volunteer industry representatives that have a primary role of identifying and advising the BC Safety Authority on public safety issues pertinent to the BC Safety Authority's mandate.

DOCUMENTS AND PUBLICATIONS

Compliance Orders: Written documents issued by a safety officer or safety manager stating that a person must take action, stop or modify his or her work to comply with safety standards and legislation.

Directives: Documents that clarify interpretations of code or regulation requirements; provide direction concerning how a regulation will be applied; or serve as the instrument by which a safety manager exercises a power granted under the *Safety Standards Act*.

Discipline Orders: Written documents issued by a safety manager to a party performing regulated work who is not in compliance with safety standards and legislation; the order may include any sanction that the safety manager considers reasonable.

Equivalent Standards Agreement: An objective-based contract made between the BC Safety Authority and a regulated company. Under this Agreement, the emphasis for safety is placed on what needs to be achieved, not how it is to be achieved.

Information Bulletins: Non-statutory and non-binding instruments that provide general information to employees, stakeholders and the public.

Monetary Penalty: An administrative penalty levied by a safety manager in amounts up to a maximum of $100,000 to penalize non-compliant behaviour.

Safety Management System: A formal framework that systematically sets out a company's rules, procedures and responsibilities with regards to safety.

Safety Orders: Binding instruments issued by safety managers to prevent, avoid or reduce the risk of personal injury or damage to property.

INCIDENT DEFINITIONS

Confirmed Incident: An incident that has established causal involvement by regulated equipment.

Disqualified as an Incident: Reported cases that do not meet the minimum requirements of an incident (as defined by the BC Safety Authority).

Incident: An event that involves technology overseen by the BC Safety Authority and either:
(a) causes death, personal injury or damage to property or
(b) creates a risk of personal injury or damage to property.

Incident Notification: A suspected incident that has been registered with the BC Safety Authority. Following investigation, we evaluate all reported cases against the definition of an incident and classify them as either an actual "incident" or "disqualified as an incident".

INCIDENT CAUSES

Environment: An incident primarily caused by or involving climate, weather or naturally occurring conditions. Examples include incidents caused by wind, lightning, earthquakes, hail, snow and mud or rock slides.

Equipment: An incident primarily caused by or involving regulated machinery or products. Equipment-related incidents are caused by either a product failure, design flaw or manufacturing flaw.

Leadership and Procedures: An incident primarily caused by or involving a failure to manage and adhere to established safety guidelines, processes and standards. This includes causes such as inadequate staff training, lack of staff, lack of maintenance, incorrect procedures, poor quality control and misuse of equipment.

Other: An incident involving regulated systems or regulated equipment, the cause of which cannot be attributed to the factors environment, equipment, leadership and procedures, people, or undetermined.

People: An incident primarily caused by or involving human-related factors. These human factors include lack of attention, a rule violation, lack of knowledge and sabotage.

Undetermined: An incident where the primary cause cannot be assessed or confirmed. Undetermined incidents are normally the result of insufficient evidence remaining from a fire and as such it is not possible to either confirm or deny that regulated equipment caused the incident.

Unspecified: An incident where the cause was not identified when reported to the BC Safety Authority. These incidents are normally investigated by another organization and later reported to the BC Safety Authority.

INJURY CLASSIFICATION

Major Injury: An injury that involves long-term impairment of function or loss of function of any body part, organ or mental faculty, significant physical pain and some disability or loss of function; this includes fractures, internal injuries or wounds that are serious but not life-threatening and psychological trauma that results in some temporary or partial disability. Medical attention is required.

Minor Injury: A non-permanent injury that may require some medical treatment; this includes lacerations, contusions, abrasions or any other injuries that have no residual effect. Further professional medical attention is not required.

Near-Miss: An incident where no actual harm resulted, but the contributory causes are serious, and under different circumstances may have led to serious injury or death.

INSPECTION DEFINITIONS

Assessment: An evaluation or review that may include physical inspection or audit.

Certificate of Inspection: A report completed by a safety officer to document the inspection of regulated work and/or product.

Inspection: A physical examination of work and products to see if they meet safety requirements.

Non-Compliance: A failure to comply with a required code or safety regulation.

Risk Assessment Program: A computer program that uses risk-based principles to assign risk scores to regulated work and regulated equipment; the scores are used by safety officers to assist them in prioritizing inspection and audit activities to focus on higher-risk regulated work.

Risk-Based: A process using the product of probability and consequence to evaluate a number of factors to determine the potential hazard.

BC Safety Authority Board of Directors 2009
Peter Cook, Chair
Richard Ballantyne
Brian Fehr
Tom Fletcher
Robert Lashin (to March 31, 2009)
Arthur Daniel Miller
George Morfitt
Daniel Mott
Janet Pau
Lorna Pawluk
Lorne Seitz
Martha Warren
John Watson
Donald Young

BC Safety Authority Executive 2009
Harry Diemer, President and Chief Executive Officer
Trevor Fedyna, Vice President Corporate Services and Chief Financial Officer
Phil Gothe, Vice President Stakeholder Engagement
Shelley Milne, Corporate Secretary and Vice President Legal and Policy
Catherine Roome, P.Eng., Chief Operating Officer
Diane Sullivan, Vice President Human Resources

BC Safety Authority Safety Managers 2009
Jason Gill, Amusement Rides and Passenger Ropeways
Stephen Hinde, P.Eng., Electrical
Janice Lee, P.Eng., Elevating Devices
Wayne Lock, Gas
Eric Samuelson, Railways
Gord Stevens, Acting Safety Manager, Boilers, Pressure Vessels and Refrigeration

BC Safety Authority State of Safety Report 2009 – Project Management
Ed Hurd, P.Eng., Leader Engineering and Research
Stephanie Salido, Engineering Administration

Safety Authority

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